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# *Indian Standard*
# SPECIFICATION FOR OLIVINE SAND AND FLOUR FOR USE IN STEEL FOUNDRIES

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NEW DELHI 110002

Gr 2 *October* 1974

# *Indian Standard*

# SPECIFICATION FOR OLIVINE SAND AND FLOUR FOR USE IN STEEL FOUNDRIES

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# *Indian Standard*

# SPECIFICATION FOR OLIVINE SAND AND FLOUR FOR USE IN STEEL FOUNDRIES

## 0. FOREWORD

**0.1** This Indian Standard was adopted by the Indian Standards Institution on 25 March 1974, after the draft finalized by the Foundry Sectional Committee had been approved by the Structural and Metals Division Council.

**0.2** Olivine is a natural mineral consisting of orthosilicates of iron and magnesium. The composition of olivine may vary and only those with high forsterite content are useful as foundry materials. Olivine sand possesses high refractoriness and less thermal expansion than silica when the proper composition is available.

**0.3** Olivine is used in foundries for the production of manganese steel castings either as moulding or core sand or as mould or core wash.

**0.4** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

## 1. SCOPE

**1.1** This standard covers the requirements for olivine sand and flour for use in steel foundries.

## 2. SUPPLY OF MATERIAL

**2.1** General requirements relating to supply of olivine sand and flour shall be as laid down in IS : 1387-1967†.

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*Rules for rounding off numerical values ( *revised* ).

†General requirements for the supply of metallurgical materials ( *first revision* ).

## 3. MOISTURE CONTENT

**3.1** Moisture content of olivine, sand or flour when tested in accordance with the method given in IS : 1918-1966*, shall not exceed 1·0 percent.

## 4. CHEMICAL COMPOSITION

**4.1** Olivine, on dry weight basis, shall have the following chemical composition:

| *Constituent* | *Requirement, Percent* |
|---|---|
| $2\,MgO.SiO_2$ | 80 *Min* |
| $2\,FeO.SiO_2 + 2MgO.SiO_2$ | 90 *Min* |
| Loss on ignition | 1·5 *Max* |

NOTE — Indian Standard method of chemical analysis of olivine is, at present, under preparation. Till it is published, the methods of chemical analysis shall be as agreed to between the purchaser and the supplier.

## 5. FUSION POINT

**5.1** When tested in accordance with IS : 1526-1960† the PCE value for olivine sand and flour shall be not below ASTM Cone No. 36 ( 1800°C ).

## 6. GRAIN SHAPE

**6.1** When tested in accordance with IS : 1918-1966*, the washed sand grain shall be mostly sub-angular in shape.

## 7. GRADE DESIGNATION

**7.1** On the basis of grain fineness, olivine sand shall be designated as S-40, S-70, S-120 and S-140 and olivine flour as F-100 and F-200 ( *see* Tables 1 and 2 ).

## 8. GRAIN FINENESS

**8.1** The grain fineness of various grades of olivine, when tested on a 100-g sample, shall conform to the requirements given in Tables 1 and 2.

**8.2** The grain fineness of olivine sand shall be determined in accordance with the method given in IS : 1918-1966*.

**8.3** The grain fineness of olivine flour shall be determined by wet screening as given in Appendix A.

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*Methods of physical tests for foundry sands.

†Sizes and shapes for firebricks ( 230 mm series ).

## 9. PACKING

**9.1** Unless specified otherwise, olivine sand or flour shall be supplied in polythene lined gunny bags each containing 50 kg.

### TABLE 1 GRAIN FINENESS FOR VARIOUS GRADES OF OLIVINE SAND

( *Clauses* 7.1 *and* 8.1 )

| IS Sieve | Grades, Percent | | | |
|---|---|---|---|---|
| | S-40 | S-70 | S-120 | S-140 |
| 850-micron | 100 Pass | — | — | — |
| 425-micron | — | 100 Pass | — | — |
| 300-micron | — | — | 100 Pass | 100 Pass |
| 212-micron | 90 *Min* retained | — | — | — |
| 150-micron | — | — | — | — |
| 106-micron | — | — | — | — |
| 75-micron | — | 90 *Min* retained | 90 *Min* retained | — |
| 53-micron | — | — | — | 85 *Min* retained |

### TABLE 2 GRAIN FINENESS FOR VARIOUS GRADES OF OLIVINE FLOUR

( *Clauses* 7.1 *and* 8.1 )

| IS Sieve | Grades, Percent | |
|---|---|---|
| | F-100 | F-200 |
| 106-micron | 100 Pass | 100 Pass |
| 75-micron | 50 *Max* retained | 10 *Max* retained and 90 *Min* pass |

Note — When IS Sieves ( *see* IS : 460-1962* ) are not available, equivalent BS or ASTM test sieves specified in Appendix B may be used. The BS and ASTM Sieves listed in Appendix B have the apertures within the limits specified for the corresponding IS Sieves.

---

*Specification for test sieves ( *revised* ).

## 10. MARKING

**10.1** The bags containing olivine sand or flour shall be clearly marked with the grade of the material, supplier's name or trade-mark.

**10.2** The material may also be marked with the Standard Mark.

**10.2.1** The use of the Standard Mark is governed by the provision of Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

## 11. SAMPLING

**11.1** Representative samples shall be drawn according to the scheme of sampling given in IS : 1811-1961*.

# APPENDIX A

( *Clause* 8.3 )

## PROCEDURE FOR WET SCREEN ANALYSIS OF OLIVINE FLOUR

### A-1. APPARATUS

**A-1.1** Following apparatus shall be used:

a) 75- and 106-micron IS Sieve.

b) 4-litre beaker.

c) 100-mm shallow drying pans.

### A-2. PROCEDURE

**A-2.1** Transfer 100 grams of the sample to the 600-ml beaker containing about 400 ml of water and thoroughly mix with a stirring rod. Place the 106-micron IS Sieve in the flared top of the 4-litre beaker, and then pour the slurried sample through the sieve. Flush any residue in the beaker on to the sieve and wash the residue on the sieve with a stream of water from a 12-mm diameter hose connected to the cold water tap until beaker is full. Reserve the screened slurry. The water pressure for washing the residue is adjusted by the faucet to just fill the hose and is directed on the sieve in a rotary motion.

---

*Methods of sampling foundry sands.

**A-2.2** Carefully flush any residue on the 106-micron IS Sieve into a shallow pan, decant the excess water, dry, and weigh the residue. The weight of residue is reported as percent on the 106-micron sieve.

**A-2.3** The reserved slurry in the 4-litre beaker is slowly poured on to the 75-micron sieve. If the superfine material tends to clog the sieve, slightly tap the side of the sieve. After, all the material, has been transferred to the screen, wash as described above until most of the superfines are washed through. Place the sieve on the 4-litre beaker and continue to wash with a rotary motion until the beaker is full. Remove the sieve, discard the washings, then continue washing the residue until the beaker is filled three times.

**A-2.4** Flush the residue on the sieve into a shallow pan, decant the excess water, dry and weigh. The weight of residue is reported as percent on the 75-micron sieve.

**A-2.5** The percent through the 75-micron sieve is found by subtracting the percent on the 106- and 75-micron screens from 100.

# APPENDIX B

( *Note under Table* 2 )

## COMPARATIVE SIEVE DESIGNATIONS OF IS, BS AND ASTM TEST SIEVES

| *IS Sieve* | *BS Sieve* | *ASTM Sieve* |
|---|---|---|
| 850-micron | 18 | 20 |
| 600-micron | 25 | 30 |
| 425-micron | 36 | 40 |
| 300-micron | 52 | 50 |
| 212-micron | 72 | 70 |
| 150-micron | 100 | 100 |
| 106-micron | 150 | 140 |
| 75-micron | 200 | 200 |
| 53-micron | 300 | 270 |

( *Continued from page* 2 )

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